

Lab 2 - Basic Frame Relay

Lab 2: Basic frame relay

Lab exercise

Your task is to configure the network in Figure 18–2 to allow full connectivity using frame relay. In order to complete the lab, you will have to use three routers—two as hosts and one as the frame relay router/switch. Configuring a frame relay switch can be a little tricky, but you will never be expected to use this for the CCNA. It is purely for use in a lab environment.

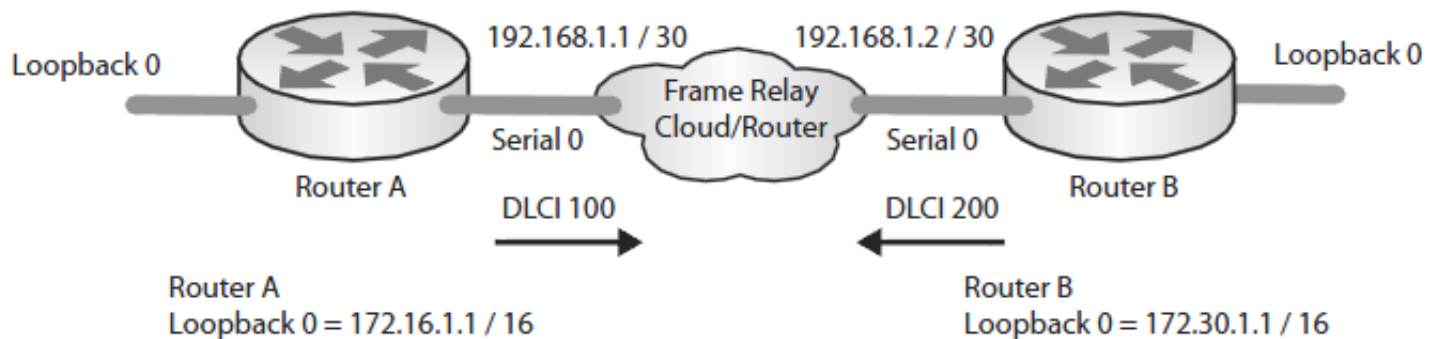


Figure 18–2: Basic frame relay

If you do not have a third router to use as a frame switch, then just practice inputting the commands on a router without being able to test it. **The DCE cables are always plugged into the frame relay switch.**

One last thing to bear in mind is that you may have plugged your cables into different interfaces than the one shown in Figure 18–2. You need to draw out your own lab diagram marking your own ports.

Text written in monospaced type indicates commands that can be entered on the router.

Purpose

Frame relay is still widely used all around the world and is still an area you could be tested on in the CCNA exam.

Lab objectives

1. Use the IP addressing scheme depicted in Figure 18–2. The frame switch will have the DCE interfaces so will need to have the clock rate command added
2. Configure frame relay on the serial interfaces of Routers A and B.
3. Configure the frame relay switch.
4. Configure RIP on Routers A and B to allow for end-to-end connectivity.
5. Test the link by pinging across.

Lab walk-through

1. Set the IP address and encapsulation type on the routers:

```
Router#config t
Router(config)#hostname RouterA
RouterA(config)#interface serial 0
RouterA(config-if)#ip add 192.168.1.1 255.255.255.252
RouterA(config-if)#no shut
RouterA(config-if)#encapsulation frame-relay
RouterA(config-if)#frame-relay interface-dlci 100
RouterA(config-if)#interface loopback 0
RouterA(config-if)#ip address 172.16.1.1 255.255.0.0
```

*** Note**—your router may show a different prompt at the dlci input.

```
Router B:
Router#config t
Router(config)#hostname RouterB
RouterB(config)#interface serial 0
RouterB(config-if)#ip add 192.168.1.2 255.255.255.252
RouterB(config-if)#no shut
RouterB(config-if)#encapsulation frame-relay
RouterB(config-if)#frame-relay interface-dlci 200
RouterB(config-if)#interface loopback 0
RouterB(config-if)#ip address 172.30.1.1 255.255.0.0
```

2. We need to configure RIP to allow all networks to see each other.

```
RouterA#config t
RouterA(config)#router rip
RouterA(config-router)#version 2
RouterA(config-router)#network 192.168.1.0
RouterA(config-router)#network 172.16.0.0
```

```
Router B:
RouterB#config t
```

```
RouterB(config)#router rip
RouterB(config-router)#version 2
RouterB(config-router)#network 192.168.1.0
RouterB(config-router)#network 172.30.0.0
```

3. We need to configure the frame relay switch. Just copy and paste the config and change the interface if you are not using the same ones we have here.

```
Router#config t
Router(config)#hostname FrameSwitch
FrameSwitch(config)#frame-relay switching « Make the router a frame switch
FrameSwitch(config)#interface serial 0
FrameSwitch(config-if)#clock rate 64000
FrameSwitch(config-if)#encapsulation frame-relay
FrameSwitch(config-if)#frame-relay intf-type dce « Interface is the DCE
FrameSwitch(config-if)#frame-relay route 100 interface serial 1 200
                « Send traffic from dlci 100 out of interface serial 1 as dlci 200.
FrameSwitch(config-if)#no shut
FrameSwitch(config-if)#interface Serial 1
FrameSwitch(config-if)#clock rate 64000
FrameSwitch(config-if)#encapsulation frame-relay
FrameSwitch(config-if)#frame-relay intf-type dce
FrameSwitch(config-if)#frame-relay route 200 interface serial 0 100
FrameSwitch(config-if)#no shut
```

4. Ping from router A to the loopback on router B.

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.30.1.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 60/60/60 ms

RouterA#

If you cannot ping, then go to the troubleshooting module (Module 9). Check that:

- The interfaces are up up.

- Clock rate is configured on the frame switch DCE interfaces.
- The encapsulation is set to frame relay on all interfaces.
- The interfaces have been “no shut”.
- You have put the correct frame relay route statements on the correct interfaces.
- You have configured the correct RIP routes.

5. Check for frame relay connectivity.

RouterA#show frame-relay map

Serial0 (up): ip 192.168.1.2 dlci 100(0x64,0x1840), dynamic,
broadcast, status defined, active

RouterA#

RouterA#show frame-relay pvc

PVC Statistics for interface Serial0 (Frame Relay DTE)

	Active	Inactive	Deleted	Static
Local	1	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

RouterA(config)#ip route 0.0.0.0 0.0.0.0 serial 0

input pkts 20	output pkts 20	in bytes 1838
out bytes 1898	dropped pkts 0	in FECN pkts 0
in BECN pkts 0	out FECN pkts 0	out BECN pkts 0
in DE pkts 0	out DE pkts 0	
out bcast pkts 10	out bcast bytes 858	
pvc create time 00:07:57, last time pvc status changed 00:03:23		

RouterA#show frame-relay lmi

LMI Statistics for interface Serial0 (Frame Relay DTE) LMI TYPE = CISCO

Invalid Unnumbered info 0	Invalid Prot Disc 0
Invalid dummy Call Ref 0	Invalid Msg Type 0

Invalid Status Message 0	Invalid Lock Shift 0
Invalid Information ID 0	Invalid Report IE Len 0
Invalid Report Request 0	Invalid Keep IE Len 0
Num Status Enq. Sent 47	Num Status msgs Rcvd 48
Num Update Status Rcvd 0	Num Status Timeouts 0

RouterA#

RouterA#debug frame-relay lmi

Frame Relay LMI debugging is on

Displaying all Frame Relay LMI data

RouterA#

00:46:38: Serial0(out): StEnq, myseq 53, yourseen 52, DTE up

00:46:38: datagramstart = 0xE3EEA4, datagramsize = 13

00:46:38: FR encap = 0xFCF10309

00:46:38: 00 75 01 01 01 03 02 35 34

00:46:38:

00:46:38: Serial0(in): Status, myseq 53

00:46:38: RT IE 1, length 1, type 1

00:46:38: KA IE 3, length 2, yourseq 53, myseq 53

00:46:48: Serial0(out): StEnq, myseq 54, yourseen 53, DTE up

00:46:48: datagramstart = 0xE3EEA4, datagramsize = 13

00:46:48: FR encap = 0xFCF10309

00:46:48: 00 75 01 01 01 03 02 36 35

00:46:48:

00:46:48: Serial0(in): Status, myseq 54

00:46:48: RT IE 1, length 1, type 1

00:46:48: KA IE 3, length 2, yourseq 54, myseq 54

00:46:58: Serial0(out): StEnq, myseq 55, yourseen 54, DTE up

00:46:58: datagramstart = 0xE3EEA4, datagramsize = 13

00:46:58: FR encap = 0xFCF10309

00:46:58: 00 75 01 01 00 03 02 37 36

00:46:58:

00:46:58: Serial0(in): Status, myseq 55

00:46:58: RT IE 1, length 1, type 0

00:46:58: KA IE 3, length 2, yourseq 55, myseq 55

00:46:58: PVC IE 0x7 , length 0x6 , dlci 100, status 0x2 , bw 0

RouterA#un all

All possible debugging has been turned off

RouterA#

Watch the myseq and yourseq incrementing; "status 0x2" means that the PVC is operational.

RouterA#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

C 172.16.0.0/16 is directly connected, Loopback0

R 172.30.0.0/16 [120/1] via 192.168.1.2, 00:00:12, Serial0

192.168.1.0/30 is subnetted, 1 subnets

C 192.168.1.0 is directly connected, Serial0

Try all of these commands on Router B also.

Show runs

RouterA#show run

Building configuration...

Current configuration : 726 bytes

!

version 12.1

service timestamps debug uptime

service timestamps log uptime

no service password-encryption

```
!  
hostname RouterA  
!  
enable secret 5 $1$jjQo$YJXxLo.EZm9t6Sq4UYeCv0  
!  
username banbury password 0 ccna  
!  
ip subnet-zero  
!  
interface Loopback0  
ip address 172.16.1.1 255.255.0.0  
!  
interface Serial0  
ip address 192.168.1.1 255.255.255.252  
encapsulation frame-relay  
frame-relay interface-dlci 100  
!  
interface Serial1  
no ip address  
shutdown  
!  
interface Ethernet0  
no ip address  
shutdown  
!  
interface BRI0  
no ip address  
shutdown  
  
!  
router rip  
version 2  
network 172.16.0.0  
network 192.168.1.0  
!
```

```
ip classless
no ip http server
!
line con 0
line aux 0
line vty 0 4
  login local
!
end
```

RouterA#

RouterB#show run

Building configuration...

Current configuration : 633 bytes

```
!
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname RouterB
!
ip subnet-zero
!
interface Loopback0
  ip address 172.30.1.1 255.255.0.0
!
interface Serial0
  ip address 192.168.1.2 255.255.255.252
  encapsulation frame-relay
  frame-relay interface-dlci 200
```



```
!  
interface Serial1  
  no ip address  
  shutdown  
!  
interface Ethernet0  
  no ip address  
  shutdown  
!  
interface BRI0  
  no ip address  
  shutdown  
  
!  
router rip  
  version 2  
  network 172.30.0.0  
  network 192.168.1.0  
!  
ip classless  
no ip http server  
!  
line con 0  
line aux 0  
line vty 0 4  
!  
end
```

RouterB#

FrameSwitch#show run
Building configuration...

Current configuration : 685 bytes

!

version 12.1

service timestamps debug uptime

service timestamps log uptime

no service password-encryption

!

hostname FrameSwitch

!

ip subnet-zero

!

frame-relay switching

!

interface Ethernet0

no ip address

shutdown

!

interface Serial0

no ip address

encapsulation frame-relay

clockrate 64000

frame-relay intf-type dce

frame-relay route 100 interface Serial1 200

!

interface Serial1

no ip address

encapsulation frame-relay

clockrate 64000

frame-relay intf-type dce

frame-relay route 200 interface Serial0 100

!

interface BRI0

no ip address

shutdown

```
!  
ip classless  
no ip http server  
!  
line con 0  
line aux 0  
line vty 0 4  
!  
end
```



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